Nov. 17, 1925. 1,561,901

E. M. BENHAM

LOCK

Filed Aug. 5. 1924

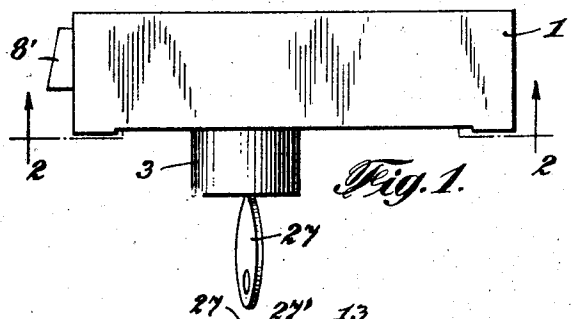


Fig. 1.

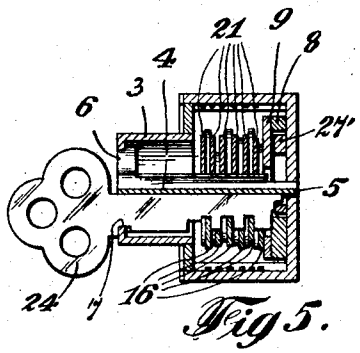


Fig 5.

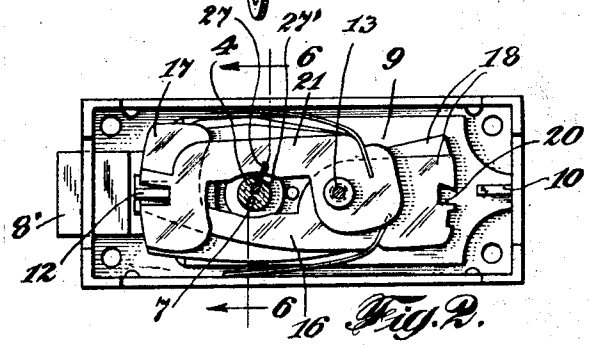


Fig. 2.

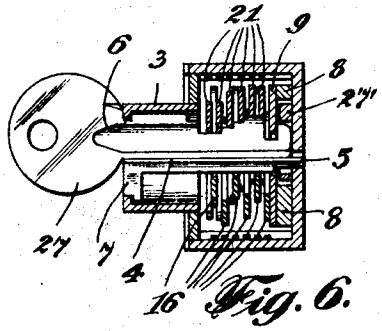


Fig. 6.

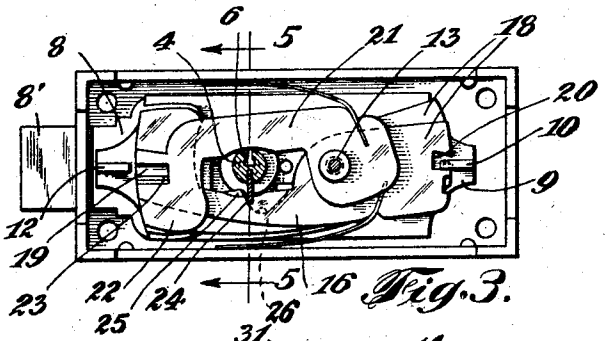


Fig. 3.

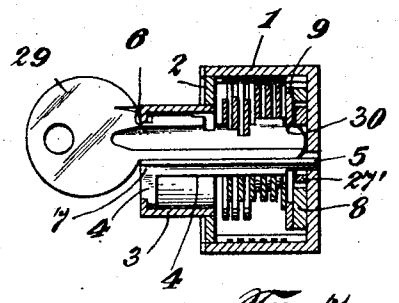


Fig. 7.

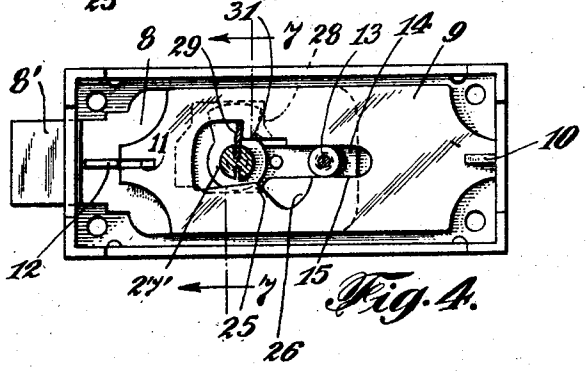


Fig. 4.

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UNITED STATES PATENT OFFICE.

EDGAR M. BENHAM, OF NORWOOD, OHIO, ASSIGNOR TO THE MOSLER LOCK COMPANY, OF COVINGTON, KENTUCKY, A CORPORATION OF OHIO.

LOCK.

Application filed August 5, 1924. Serial No. 730,133.

To all whom it may concern:

Be it known that I, EDGAR M. BENHAM, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Locks, of which the following is a specification.

This invention relates to locks, and more particularly relates to locks of the type which require the manipulation of two keys to unlock the same.

In an application for improvements in locks filed by Edgar M. Benham July 11, 1921, Serial No. 483,674, and patented Jan. 13, 1925, No. 1,522,572, there is disclosed a lock having two sets of alternately overlapping tumblers, commonly pivoted, one set being master tumblers operable by a locking and unlocking key from one key tube of the lock and the other set of tumblers being guard tumblers and being operable by a guard key from another key tube. To unlock the lock required the turning of the guard key and the leaving of the guard key in turned position in the lock during the unlocking by the regular key, for as soon as the guard key was turned back the guard tumblers resumed dogging position.

The principal object of this invention is to improve upon said construction by providing means for permitting removal of the guard key before unlocking of the lock by the regular key, and also by requiring only a single nose on the lock for both keys instead of two noses. A further object of this invention is to provide a lock of the character described, and one which, after being unlocked in the regular way, prevents the removal of the unlocking key until the lock has again been locked, and upon being locked, automatically releases the guard tumblers to require the use of the guard key before the lock can be unlocked again. Another object of this invention is to provide means for releasing the guard tumblers without unlocking the lock, should the guard tumblers have been set up and the lock not unlocked. Another object of this invention is to provide a lock of the character described, and one which is simple, durable, sturdy and compact in construction. Other objects of this invention will be in part obvious and in part pointed out hereinafter.

In accordance with this invention, the previous construction is retained, comprising two separate sets of tumbler plates nested together in alternately overlapping relation and commonly pivoted on a pin carried on the lock casing. One set of tumblers are master tumblers and the other set are guard tumblers. Both sets of tumblers have recessed noses toward the front of the lock and dog a stump carried by the bolt bar, until the recesses of both sets are aligned with the stump, whereupon retraction of the bolt plate is permitted. The guard tumblers also have recessed noses toward the rear of the lock, and the recesses are adapted to be aligned by the operation of a guard key with each other and with a stump carried on an auxiliary plate, and the stump moved into the recesses, whereby these tumblers are held in this position even though the guard key is withdrawn. In this position the guard tumblers are properly set up at the front of the lock to permit unlocking of the lock when the master tumblers are set up by the regular key, and the bolt retracted thereby. As the regular key retracts the bolt it also engages the auxiliary plate to disengage the rear stump from the guard tumbler rear recesses. Thus when the lock is locked again the guard tumblers become upset. The auxiliary plate also limits the retraction of the bolt plate to such an extent that the regular key may not be rotated sufficiently to be removable when the lock is unlocked.

In order that a clearer understanding of this invention may be had, attention is hereby directed to the accompanying drawings forming a part of this application and illustrating one possible embodiment of this invention. In the drawings, Fig. 1 is a top plan of the lock embodying this invention; Fig. 2 is a sectional view of the same taken beneath the cover plate, as on the line 2—2 of Fig. 1, the lock being in fully unlocked condition; Fig. 3 is a view similar to Fig. 2, but shows the guard tumblers set up by the guard key into unlocked position and engaged by the rear stump, previous to the removal of the guard key and the unlocking of the lock by the regular key; Fig. 4 is a view of the interior of the lock with the tumblers removed showing the positions of the bolt plate and guard plate when the lock is fully locked, and a throw-off key engaging the guard plate; Fig. 5 is a sectional

view taken on the line 5—5 of Fig. 3, including the guard key; Fig. 6 is a sectional view taken on the line 6—6 of Fig. 2, including the regular key; and Fig. 7 is a sectional view taken on the line 7—7 of Fig. 4, including the throw-off key. Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring to the drawings, I provide a suitable casing for the lock mechanism, the casing comprising a box portion 1 and a cover plate or lid 2. 3 designates a suitable tubular extension or nose in which is rotatably mounted the upper end of a key tube 4, which is pivoted in the bottom of the box 1, as at 5. The key tube 4 is provided with two suitable key ways, one, 6, for the locking key and the throw-off key, and the other, 7, for the guard key. In the casing, on the bottom thereof, I slidably mount a bolt plate 8 which at its front end has a bolt portion 8′ protruding through an opening provided therefor in an end of the casing 1. Over plate 8 I position a guard plate 9, which at its rear carries a stump 10. The front of plate 9 has a slot 11 which slidably engages a stump 12 on the bolt plate, whereby the front of the guard plate is guided. Plate 8, as well as plate 9, may be guided in the casing by means of a post 13 secured to the casing, and which extends through suitable slots 14 and 15 provided in these plates. The guard tumblers 16 are pivoted on post 13 and are provided with noses 17 toward the front of the lock for dogging the bolt stump 12, and with noses 18 toward the rear of the lock. Noses 17 have slots 19 adapted, when these tumblers are set up, to register with and receive the front stump 12, and the rear noses 18 have slots 20 which are adapted to be aligned with the rear stump 10 to permit this stump to be engaged in these recesses to hold the tumblers set up. The master tumblers 21 are also pivoted on the post 13. These tumblers do not have noses at their rear but have noses 22 at the front adapted to dog the bolt stump 12. These noses have recesses 23 adapted to be aligned with each other and with the front stump 12 to permit retraction of the bolt, provided the guard tumblers are set up. The guard tumblers 16 and the regular tumblers 21 are arranged in a stack in alternate succession and are commonly pivoted on post 13. Thus each tumbler functions as a spacer between the two adjacent tumblers of the other set. The tumblers of the two sets are adapted to pivot in opposite directions, and for this purpose the bodies of the two sets of tumblers are disposed on opposite sides of the key tube 4.

Further details of construction will become apparent in the following description of operation of the lock:—Starting with the lock in fully locked position, the proper guard key 24 is inserted in the key way 7 of the key tube and is turned to pivot the guard tumblers 18 and move both their front and rear recesses in alignment respectively with the stumps 10 and 12, and then engages against a shoulder 25 provided in the guard plate 9 and moves this plate forwardly, bringing the stump 10 into the aligned slots 20 of the guard tumblers. Behind shoulder 25 the plate 9 is cut away, as at 26, to permit reverse movement and removal of the guard key without disturbing the said condition of the plate 9, thus leaving the guard tumblers set up by reason of the engagement of stump 10 in their rear recesses. The proper regular key 27 is now inserted in the slot 6 of the key tube and turned. This key, engaging the master tumblers and not the guard tumblers, first brings the recesses at the front edges of the master tumblers 21 into alignment behind the front stump 12 and then, by the usual engagement between a cam member 27′ and a shoulder 28 on the plate 8, retracts the bolt, since all the tumblers are set up and the tumbler recesses are aligned behind stump 12. This movement of the bolt causes the stump 10 to be withdrawn from the guard tumbler rear recesses. When the plate 9 has been moved forwardly by the guard key, the stump 12 is in the recess 11 at the front edge of this plate, so that when the bolt is moved into unlocked position the plate 9 is carried rearwardly until it strikes the rear wall of the casing, or the stump 12 strikes the bottom of the tumbler recesses. The stump 10, by this movement, is taken out of the slot 20 of the guard tumblers, and when the lock is locked again by reverse rotation of the regular key, the stump 12 consequently is withdrawn from the recesses of both sets of tumblers, and the guard tumblers will fall behind the stump 12 and prevent unlocking of the lock by means of any regular key, and until the guard tumblers have been properly set up again by means of the proper guard key. The regular key cannot be turned a full half revolution in unlocking direction because of the engagement of the stump 12 with the tumblers, thus preventing removal of the regular key while the lock is in unlocked condition.

If, after the guard key has been operated to set up the guard tumblers, the person having the regular key does not unlock the lock, another key, commonly called a throw-off key, may be provided to upset the guard tumblers again without unlocking the lock. Such a key is illustrated in the drawings at 29, and is operable in the

key slot 6. This key is provided with a special bit 30 which is adapted to engage a shoulder 31 provided on the plate 9, so that rotation of this key in the key tube will cause rearward movement of plate 9 and thus removes the stump 10 from engagement with the guard tumblers, and upsets the guard tumblers without setting up the regular tumblers.

Locks having this construction can be arranged for an infinite number of different regular and guard keys by varying the positions of the recesses of the tumblers.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim is:—

1. In a lock of the character described, in combination, a pin, a plurality of tumblers commonly pivoted on said pin, a key tube, some of said tumblers being operable in one direction by one key when placed in said key tube and rotated in one direction and others of said tumblers being operable in the opposite direction by another key when placed in said key tube, and rotated in a direction opposite to said rotation of the other key.

2. In a lock of the character described, in combination, a set of master tumblers, a movable guard plate having a stump, a set of guard tumblers having recesses for said stump, and a guard key engageable with said tumblers and said plate and adapted to align said recesses with said stump and to move said stump into said recesses, whereby said guard tumblers are maintained in set up condition, said sets of tumblers being commonly pivoted and operable in opposite directions.

3. In a lock of the character described, in combination, a guard plate having a stump, guard tumblers having recesses for said stump, and a guard key operable to align said recesses with each other and with said stump, said plate being movable by said key to take said stump into said recesses when so aligned, whereby said tumblers are maintained in set up condition, a bolt plate, a regular key for reciprocating said bolt plate, said bolt plate when moved in unlocking direction moving said guard plate to withdrawn said stump from the said recesses in the guard tumblers, and master tumblers controlling movement of said bolt plate and operable by said regular key, said guard and master tumblers being commonly pivoted and operable in opposite directions.

4. In a lock of the character described, in combination, a guard plate having a stump, guard tumblers having recesses for said stump, and a guard key operable to align said recesses with each other and with said stump, said plate being movable by said key to take said stump into said recesses when so aligned, whereby said tumblers are maintained in set up condition, a bolt plate, a regular key for reciprocating said bolt plate, said bolt plate when moved in unlocking direction moving said guard plate to withdraw said stump from the said recesses in the guard tumblers, and master tumblers controlling movement of said bolt plate and operable by said regular key, said bolt plate having a stump and said guard and master tumblers having noses dogging said stump, said guard tumbler noses having recesses adapted to align with said stump when said tumblers are set up, and said master tumbler noses having recesses adapted to be aligned with said stump by means of said regular key, said guard and master tumblers being commonly pivoted and operable in opposite directions.

5. In a lock of the character described, in combination, a guard plate having a stump, guard tumblers having recesses for said stump, and a guard key operable to align said recesses with each other and with said stump, said plate being movable by said key to take said stump into said recesses when so aligned, whereby said tumblers are maintained in set up condition, a bolt plate, master tumblers dogging said bolt plate, and a throw-off key adapted to engage and move said guard plate to withdraw said stump from said recesses while said master tumblers dog the bolt plate, said guard and master tumblers being commonly pivoted and operable in opposite directions.

This specification signed this 21 day of July, 1924.

EDGAR M. BENHAM.